

[54] HARNESS BOARD MODULE

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[51] Int. Cl. **B21f 27/00**

[58] Field of Search **140/92.1, 93;**
287/20.92 T, 20.92 E, 20.92 K, 20.92 D;
52/588, 579; 317/117, 122; 179/98; 29/203 B

[56] **References Cited**

UNITED STATES PATENTS

3,653,411	4/1972	Mosher et al.	140/92.1
3,608,260	9/1971	Eckel et al.	52/588
3,648,393	3/1972	Parrilla	287/20.92
3,487,756	1/1970	Glaza et al.	52/579
3,563,582	2/1971	Shroyer et al.	287/20.92
883,489	3/1908	Schossow	287/20.92
2,933,656	4/1960	Ruth	317/122
3,462,649	8/1969	Stich	317/122
3,489,954	1/1970	Humphrey et al.	29/203
3,573,373	4/1971	Mullin et al.	317/122

FOREIGN PATENTS OR APPLICATIONS

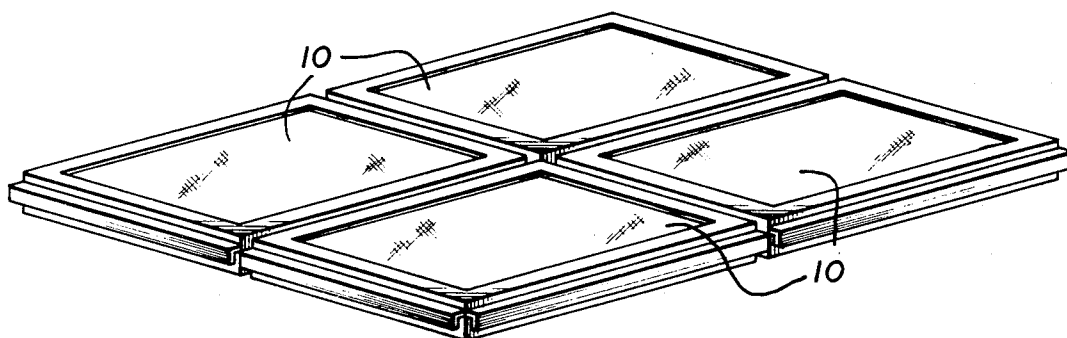
1,226,352	3/1971	Great Britain	287/20.92
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Primary Examiner—Lowell A. Larson
Attorney—David Teschner et al.

[57] **ABSTRACT**

The invention is directed to harness board module coupling means for coupling such modules together to form a harness board of desired dimensions. A central retention means arranged to receive and retain therein harnessing aids is bounded on at least one of its four edges by a framing member to which is coupled a coupling means whereby similar harness board modules may be coupled one to another. The coupling members may be in the form of hermaphroditic hooks such that adjacent modules are placed in inverted relationship one to another. Magnets may be used as a coupling means, or by the use of dovetail slots, within the framing members and appropriately shaped coupling pins, respective modules may be coupled to one another. The framing member may be applied to the edges of the retention means by employing adhesive means or by the use of barbed projections engaging themselves within the surface of the retention means. Attentively, the framing member may also include extending portions which overlies a portion of the surface of the retention means providing complete framing for the retention means.

9 Claims, 9 Drawing Figures



2 Sheets-Sheet 1

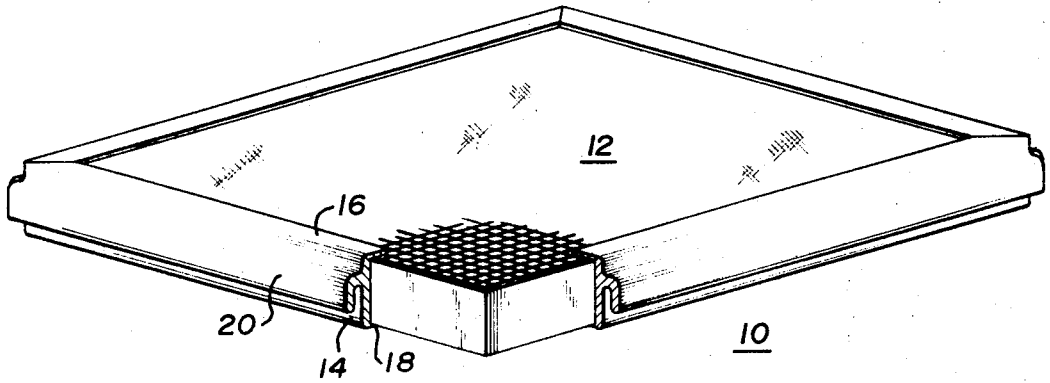


FIG. 1

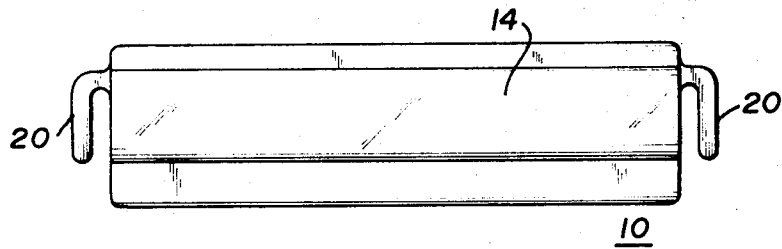


FIG. 2

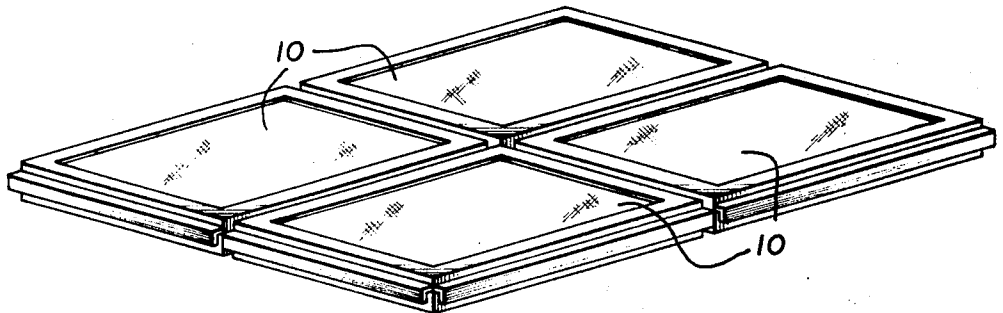
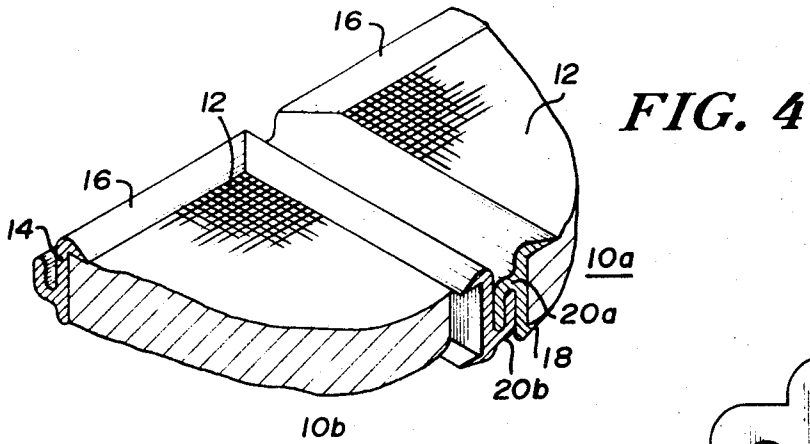
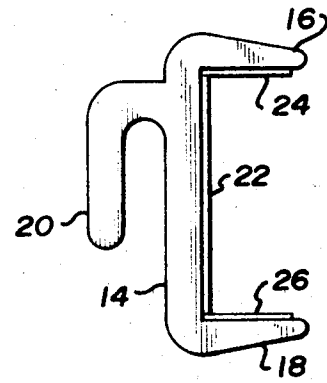
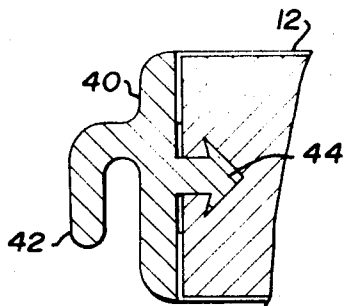
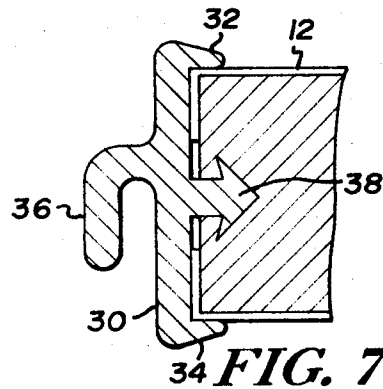
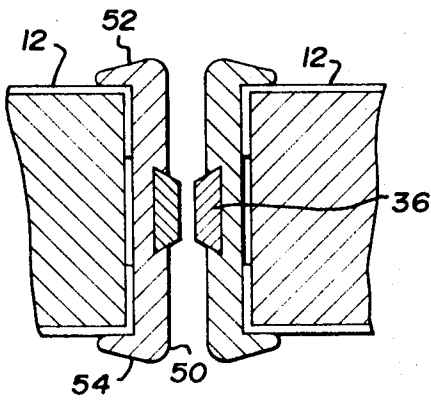
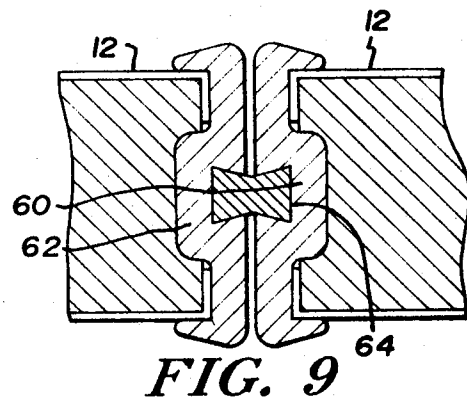


FIG. 3



HARNESS BOARD MODULE

BACKGROUND OF THE INVENTION

1. Field of the Invention

The invention finds utility in the field of fabrication of harnesses for electrical and electronic equipment. The invention finds particular utility in those arrangements wherein the harnesses of electrical conductors are formed and assembled in locations remote from the point of actual use, from

2. Description of the Prior Art

According to prior art techniques when a harness of electrical conductors was to be fabricated it was common to take a sheet of plywood, approximately 4 feet $\times$ 8 feet, and to tack upon a surface thereof a routing diagram showing the arrangement of the conductors within the harness. Flanking the route of the electrical conductors, as they progressed from one portion of the harness to another, were placed a number of nails which served as a guide for the wires. Once the harness had been completed, tied and removed from the harness board, the harness board could be destroyed effectively by removing the nails and routing drawing therefrom or could be saved and stacked for later use. In either situation a great deal of time was consumed in the preparation of the harness board, the removal of the nails and routing diagram as well as the requirement for storage and logging of the harness board which was retained. If a great number of harnesses were regularly used, it was essential that a great number of harness boards be stored. In some situations harnesses smaller than those which could be placed upon the surface of a 4 feet $\times$ 8 feet sheet of wood were required, thereby requiring smaller wood sheets and requiring storage facilities different than those required for the larger sheets.

An effort to simplify the making and using of harness boards is shown in U.S. Pat. No. 3,346,020, issued Oct. 10, 1967, to George H. Geisinger, entitled "Wire Harness Device," assigned to the assignee of the instant invention. The device of the patent was a reusable harness board which facilitated the insertion and removal of harnessing aids so that the same board surface might be used as many times as necessary. This eliminated the problem of storage of assembled boards. However, such an arrangement produces a fixed size board, requiring different boards for every possible size of harness the user desires to make. To employ only a single large sized harness board of the type shown in the patent would be to waste a large portion thereof for smaller harnesses. Similarly, should the user attempt to put large harnesses upon a small sized board, the harness could only be completed in those sections which then overlaid the harness board. A number of boards of the type shown in the patent could be laid in a side to side relationship, however, one could not be sure that the harness boards would remain together during the activity of laying out the individual electrical conductors for assembling the harness.

SUMMARY OF THE INVENTION:

The present invention seeks to overcome the difficulties noted above with respect to prior art devices by providing a reusable harness board much along the lines of the Geisinger patent and in addition by providing modularity, permitting the user to purchase modules at a given basic dimension which can be coupled

one to another the user is able to build-up from the basic module size, a harness board of the desired dimensions suitable for his particular use. This is accomplished by providing a basic harness board module having a retention member constructed along the lines of the Geisinger patent and which is framed, at least its edges, with a frame member to which is attached a coupling member to facilitate the coupling of adjacent modules in a selectively separable fashion. The frame member may also overlaid portions of the surface area of the retention member and may be affixed thereto by means of an adhesive layer or by means of protrusions engaging within the retention member itself. The coupling member may be in the form of a hermaphroditic hook by which the adjacent modules are assembled one to another in inverted relationship or may take the form of permanent magnets for engaging similar permanent magnets in other modules. Another type frame member may be provided with a dovetail slot to receive therein an appropriately shaped retention pin. The basic shape of the module will be that of a rectangle and may thus be built-up to any desired size based on the intended use thereof. It is therefore an object of this invention to provide improved harness boards.

It is another object of this invention to provide an improved harness board constructed of individual harness board modules which may be coupled to one another to provide a harness board of desired dimension.

It is yet another object of this invention to provide an improved harness board module which may be coupled to similar modules by means of hermaphroditic coupling devices.

It is yet another object of this invention to provide an improved harness board made of modules, individual modules of which may be assembled by means of permanent magnets.

It is still another object of this invention to provide an improved harness board constructed of harness board modules each of which may be assembled as desired by means of dovetail slots and retention pins.

Other objects and features of this invention will be pointed out in the following description and claims and illustrated in the accompanying drawings, which disclose, by way of example, the principles of the invention, and the best modes which have been contemplated for carrying them out.

BRIEF DESCRIPTION OF THE DRAWINGS:

In the drawing in which similar elements are given similar reference characters.

FIG. 1 is a front perspective view of a harness board module constructed in accordance with the concepts of the invention.

FIG. 2 is a front elevational view of a module of FIG. 1.

FIG. 3 is a front perspective view of a number of individual harness board modules assembled to form a larger harness board.

FIG. 4 is a front perspective view, partially in section, of two fragmented harness board modules showing the manner of interconnection thereof.

FIG. 5 is a front elevation of the frame member and hermaphroditic coupling device of FIG. 1.

FIG. 6 is a front elevation, partially in section, of an alternative form of frame member and hermaphroditic coupling device shown assembled to a retention member shown in section.

FIG. 7 is a front elevational view, partially in section, of yet another form of frame member and hermaphroditic coupling shown assembled to a retention member shown in section.

FIG. 8 is a front elevational view of a further form of frame member and hermaphroditic coupling shown coupling two harness board modules, shown in section.

FIG. 9 is a front elevational view of yet another form of frame member and hermaphroditic coupling which may be employed to couple together individual harness board modules, shown in section.

DESCRIPTION OF THE PREFERRED EMBODIMENTS:

Turning now to FIG. 1 there is shown a harness board module 10 constructed in accordance with the concepts of the invention. Module 10 has a work surface or retention member 12 which may be constructed in accordance with the concepts set forth in the above cited Geisinger patent. That is, it may have a series of spaced apart boards each of which has apertures there-through to receive therein to position and hold harnessing aids such as nails, clamps, guide posts and the like. Alternatively, it may have a series of screen members, the perforations or apertures of the screen members being an alignment to similarly receive and hold the harnessing aids. Further, it may be constructed of a sheet resilient material such as rubber, plastic foam, or the like, above or bounded by screen members for the receipt and holding of the harnessing aids to be used. Placed around the edges of the retention member 12 is a frame member 14 (best seen in FIG. 5) having extending arms 16 and 18 which overlie portions of the surface of the retention member 12 adjacent the edges thereof. A hermaphroditic hook member 20 extends from the frame member 14 (see FIG. 2) on all four sides of the module 10 so that similar modules 10 may be coupled to one another on any one of the four sides thereof, as is better seen in FIG. 3. In FIG. 3 four modules 10 are coupled together by interconnecting their hermaphroditic hook members 20. In order to couple together two modules it is necessary to invert each alternate adjacent module, as is better seen from FIG. 4. In FIG. 4 module 10a is shown oriented in the manner of the module shown in FIG. 1 while module 10b has been inverted with respect to the module orientation shown in FIG. 1. In this manner it is possible for the hook member 20b to engage the hook member 20a of the module 10a thus assembling the modules 10a and 10b together. In a similar fashion modules to be placed adjacent the module 10b will be oriented similar to the module 10a. Other modules to be joined to the module 10a will take the orientation shown by the module 10b.

As is shown in FIG. 5 the frame member 14 and the hermaphroditic coupling hook 20 may be prepared for attachment to the retention means 12 in FIG. 1 by providing an adhesive layer above a portion of the inner surface thereof. That is, layer 22 may be placed on the back portion of frame member 14 for attachment directly on the edge of the retention member 12. Alternatively, it is possible to put adhesive layers 24, 26 on the extending arms 16 and 18 of the frame member 14 to thus engage the surfaces of the retention member 12. Also, it is possible to employ all of the adhesive layers 22, 24, 26 in order that the frame member 14 be adhered on the edges and portions of the top and bottom surface of the retention member 12.

It should be noted that the description of the module 10 thus far has been in terms of the module 10 taking the form of a rectangle although such shape is not necessary for the proper operation of the harness board module system. Where appropriate, the harness board module may take the shape of a square, diamond, hexagon, or regular form which permits it to be built-up in the manner generally described with reference to the module 10. In general it has been found that regular geometric shapes lend themselves to interconnection most easily.

As an alternative to adhering the frame member to the retention member by means of an adhesive layer it is also possible to attach framing member 30 to the retention member 12 by means of a barbed projection protrusion 38 which is forced into the edge of retention means 12, as is shown in FIG. 7. The barbed ends of the projection 38 will engage with the material of the retention member 12 and prevent its being withdrawn. Frame member 30 includes extending arms 32 and 34. However, extending arms 32, 34 may be omitted as shown in FIG. 6 wherein frame member 40 has a hermaphroditic hook member 42 and barbed projection 44 for engaging retention member 12.

If it is desired entirely to omit the necessity for inversion of respective adjacent modules when assembling same into an overall harness board it is possible to join two harness board modules by means of permanent magnets as is shown in FIG. 8. In FIG. 8 the retention surface 12 is bounded by a frame 50 and extending arms 52, 54 into which is placed a permanent magnet 56 in place of the hermaphroditic hook as was shown in FIG. 5. In this manner two similar harness board modules may be coupled without the inversion of either of the module members. This permits subsections of a harness to be laid out separately and later joined without concern for the position of the particular module in the overall board. This can also be accomplished, as is shown in FIG. 9, wherein retention members 12 are provided with a frame member 60 with a dovetail slot 62 therein. An appropriately shaped (bow type shaped in this case) retention pin 64 then be slipped into adjacent dovetail slots 62 to lock the two modules together. Any other shape of slot or pin may be employed to provide such coupling.

The embodiments of the invention in which an exclusive property or privilege is claimed are defined as follows:

1. A harness board module comprising: a retention member formed of resilient material disposed between screen members and having first and second surfaces and first, second, third and fourth edges, for receiving selectively positionable harnessing aids inserted thereinto from at least one of said first and second surfaces, said screen members providing a predetermined grid pattern for locating said harnessing aids; frame means coupled to said first, second, third and fourth edges of said retention means; and coupling means coupled to said frame means for releasably coupling said module to similar modules to provide a generally planar configuration of independently supportable, disengageably interconnected harness board modules of desired size.

2. A harness board module as defined in claim 1, wherein said coupling means is hermaphroditic and each module is inverted with respect to its adjacent modules.

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3. A harness board module as defined in claim 1, wherein said coupling means is a hook.

4. A harness board module as defined in claim 1, wherein said coupling means are selectively removable pin means.

5. A harness board module as defined in claim 1, further comprising an adhesive layer intermediate said framing means and said retention means to couple said frame means to said retention means.

6. A harness board module as defined in claim 1, further comprising engaging means for entering into said retention means coupled to said frame means for coupling said frame means to said retention means.

6

7. A harness board module as defined in claim 1, wherein said frame means has a dovetail slot therein and said coupling means is a correspondingly shaped, selectively removable pin means.

8. A harness board module as defined in claim 1, wherein said frame means bounds said first, second, third and fourth edges of said retention means.

9. A harness board module as defined in claim 1, wherein said frame means bounds said first, second, third and fourth edges of said retention means and overlies a portion of said first and second surfaces thereof.

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